

● NCLEX-RN • 2026 TEST
PLAN

PHARMACOLOGY BRIEF • VOL. 47

CARDIOVASCULAR SYSTEM • α_1 -ADRENERGIC
AGONIST

— HIGH-YIELD DRUG PROFILE • NGN / NCJMM ALIGNED

FILE / 047
PRESSORS • SERIES 02
HIGH-ALERT MED

Phenylephrine.

GENERIC / BRAND

Phenylephrine • Neo-Synephrine, Vazculep, Sudafed PE

DRUG CLASS

Selective α_1 -Adrenergic Agonist • Pure Vasopressor

BODY SYSTEM

Cardiovascular • ENT • Ophthalmic

§ 01 / 10

— Drug Overview

- ▶ **IV vasopressor** for hypotension — especially when tachyarrhythmias are present
- ▶ Hypotension from **spinal/epidural anesthesia** (gold-standard use)
- ▶ **Septic shock** when norepi causes tachyarrhythmia
- ▶ Hypotension during **cardiac surgery** & neurogenic shock
- ▶ Conversion of **paroxysmal SVT** via reflex vagal stimulation
- ▶ OTC **nasal decongestant** (rhinitis, sinusitis)
- ▶ Ophthalmic **mydriatic** for eye exams & pre-op
- ▶ *"Pure pressure — no rate."* The β -free vasopressor.

§ 02 / 10

Mechanism of Action

Phenylephrine binds **α_1 -adrenergic receptors** on vascular smooth muscle

- Intense **arteriolar & venous vasoconstriction** (peripheral, splanchnic, renal beds)
 - Increased **systemic vascular resistance (SVR)**
 - Increased **mean arterial pressure (MAP)**
 - Baroreceptors sense the BP spike → vagal tone ↑
 - **Reflex bradycardia** (expected — NOT a complication)
- ▶ **Zero β -1 effect** → no inotropy, no chronotropy
 - ▶ **Zero β -2 effect** → no bronchodilation, safe in low-CO states where chronotropy is undesirable
 - ▶ **Key contrast:** Epi/Norepi hit $\alpha + \beta$; phenylephrine is α_1 -pure

§ 03 / 10

Therapeutic Effects

- ▶ **↑ SBP, DBP, MAP** — target MAP ≥ 65 mmHg
- ▶ **HR slows or stays flat** (reflex baroreceptor effect)
- ▶ Improved **cerebral & coronary perfusion**
- ▶ Pupillary **mydriasis** (ophthalmic use)
- ▶ Decreased **nasal mucosal edema** (decongestant)
- ▶ Termination of **SVT** via vagal reflex
- ▶ *Working = BP rises while HR holds or drops*

§ 04 / 10

— Side Effects & Adverse Reactions

- ▶ **COMMON** **Reflex bradycardia** — expected; only treat if symptomatic
- ▶ **COMMON** Headache, restlessness, anxiety, tremor, paresthesias
- ▶ **COMMON** Pallor, piloerection ("goosebumps"), cold extremities
- ▶ **COMMON** Nausea, vomiting, dry mouth
- ▶ **SERIOUS** ⚠ **Severe hypertension** → hypertensive crisis, stroke, MI
- ▶ **SERIOUS** ⚠ **Extravasation** → **tissue necrosis & sloughing** (HIGH-ALERT)
- ▶ **SERIOUS** ⚠ Severe reflex bradycardia with hemodynamic compromise
- ▶ **SERIOUS** ⚠ Decreased **cardiac output** from extreme afterload
- ▶ **SERIOUS** ⚠ Decreased **renal perfusion** → AKI, oliguria
- ▶ **SERIOUS** ⚠ **Mesenteric ischemia**, digital/limb ischemia
- ▶ **SERIOUS** ⚠ Pulmonary edema, dysrhythmias, MI
- ▶ **SERIOUS** ⚠ **Rebound nasal congestion** if used > 3 days (rhinitis medicamentosa)

§ 05 / 10

— Priority Nursing Considerations

- | | | |
|---|---|--|
| ▶ ASSESS Baseline BP, HR, rhythm, MAP, perfusion before initiating | ▶ MONITOR Continuous BP — arterial line preferred for IV titration | ▶ HOLD SBP >180 or MAP exceeds ordered ceiling |
| ▶ ASSESS IV site q15min — pallor, blanching, swelling, pain = extravasation | ▶ MONITOR HR & rhythm via continuous ECG | ▶ HOLD HR < 50 with symptoms (hypotension, chest pain) |
| ▶ ASSESS Urine output (renal perfusion marker) — <0.5 mL/kg/hr is concerning | ▶ MONITOR Titrate to MAP ≥ 65 mmHg (or provider-set goal) | ▶ NOTIFY Extravasation — STOP infusion, leave catheter, give phentolamine SQ around site |
| ▶ ASSESS Distal pulses, capillary refill, skin temperature/color | ▶ MONITOR Lactate, electrolytes, BUN/creatinine | ▶ NOTIFY Signs of organ ischemia (chest pain, abdominal pain, oliguria) |

CONTRAINDICATIONS & MAJOR INTERACTIONS

- | | |
|--|---|
| ▶ Contraindicated: severe HTN, ventricular tachycardia, narrow-angle glaucoma, severe bradycardia, hypersensitivity | ▶ Cautious use: CAD, hyperthyroidism, diabetes, BPH, elderly |
| ▶ MAOIs (within 14 d) → <i>hypertensive crisis</i> — AVOID | ▶ TCAs → potentiated pressor response |
| ▶ Oxytocin → severe postpartum HTN | ▶ Beta-blockers → unopposed α effects, severe HTN, bradycardia |
| ▶ Digoxin / Halogenated anesthetics → ↑ arrhythmia risk | ▶ Atropine blocks reflex bradycardia — may worsen HTN |

§ 06 / 10

— Labs & Diagnostics

- ▶ **Continuous BP / MAP** — goal MAP ≥ 65 (or per order)
- ▶ **HR & rhythm** via telemetry — watch for severe brady
- ▶ **Lactate** — ↑ trend = worsening tissue perfusion
- ▶ **BUN / Creatinine** — rising = renal hypoperfusion
- ▶ **Urine output** — <0.5 mL/kg/hr = concerning
- ▶ **ABG & SvO₂** in critical care
- ▶ **Electrolytes (K⁺, Mg²⁺)** — arrhythmia risk if abnormal
- ▶ **Troponin** if chest pain or ischemic ECG changes

§ 07 / 10

Administration & Safety

- ▶ **HIGH-ALERT** IV pressor — confirm two-RN check, smart-pump titration
- ▶ **Route:** IV bolus, IV continuous infusion, IM/SQ, intranasal, ophthalmic
- ▶ **Central line strongly preferred** for continuous infusion (vesicant)
- ▶ If peripheral IV used — choose **large proximal vein**, monitor q15 min
- ▶ **Onset:** IV — almost immediate; **Duration:** ~15–20 min
- ▶ **Titrate** to MAP/SBP goal — small frequent changes, never large jumps
- ▶ **Wean gradually** — abrupt stop = rebound hypotension
- ▶ **Antidote for extravasation:** *Phentolamine 5–10 mg in 10–15 mL NS*, infiltrated SQ at site within 12 h
- ▶ **Nasal:** max 3 days to prevent rebound congestion
- ▶ **Compatible** with NS, D5W; verify Y-site compatibility

§ 08 / 10

Patient Education

- ▶ Report **chest pain, severe headache, blurred vision, palpitations** immediately
- ▶ Report any **burning, swelling, or color change** at IV site
- ▶ (Nasal OTC) Use **no longer than 3 days** — rebound congestion is real
- ▶ Avoid OTC phenylephrine if you have **HTN, heart disease, hyperthyroidism, BPH, or glaucoma**
- ▶ Do **NOT combine** with MAOIs (or within 14 days of stopping)
- ▶ Use caution with **caffeine** — synergistic CV stimulation
- ▶ Diabetics: may **mask hypoglycemia** symptoms (tachycardia)
- ▶ Ophthalmic drops: **blurred vision & photosensitivity** — wear sunglasses, avoid driving

§ 09 / 10

— NCLEX Test Traps !

- ▶ **Trap:** Confusing with epinephrine/norepinephrine — phenylephrine has *NO β effect* (no rate, no inotropy)
- ▶ **Trap:** Thinking reflex bradycardia is an adverse event — it's an *expected pharmacologic response*
- ▶ **Trap:** Choosing "increase rate" when BP rises & HR drops — this is the drug *working as designed*
- ▶ **Trap:** Forgetting it can *treat* SVT (raises BP → vagal slowing)
- ▶ **Trap:** Treating extravasation with warm compresses — wrong; use *cold compress + phentolamine*
- ▶ **Trap:** Choosing peripheral IV as best site — *central line* is the safe answer
- ▶ **Trap:** Picking phenylephrine for *anaphylactic shock* — that's epinephrine (needs β effects)
- ▶ **Trap:** Missing that decreased urine output = *decreased renal perfusion*, not "drug working"
- ▶ **Trap:** Selecting it for *cardiogenic shock* with low CO — afterload increase worsens it

§ 10 / 10

— Memory Boosters

- ▶ **PHENyl = PURE alpha** — no β , no β -2, just squeeze
- ▶ **α_1 = "Squeeze the pipes"** → vasoconstriction → $\uparrow$ BP
- ▶ **"Slow heart, high pressure"** — reflex brady + HTN is the signature
- ▶ **"Pressor without a pulse-push"** — picks pressure, not rate
- ▶ **PEPS up the pressure:**
Pure α -agonist · Extravasation risk (phentolamine!) ·
Peripheral cold/pale · SVT can be treated
- ▶ **"Phenyl = Phentolamine"** — drug & antidote share the "phen-"
- ▶ **"Three days & done"** — OTC nasal limit before rebound
- ▶ **Compare-class quick code:** α only = Phenyl · $\alpha + \beta$ = Norepi · $\alpha + \beta + \beta_2$ = Epi

Most-Tested *Vasopressors.*

SIDE-BY-SIDE • NCLEX HIGH YIELD
RECEPTOR • USE • PITFALL

AGENT	RECEPTORS	PRIMARY USE	HALLMARK EFFECT	NCLEX TRAP / PITFALL
Phenylephrine	α_1	Hypotension w/ tachycardia · spinal anesthesia · SVT	↑ BP + <i>reflex</i> <i>bradycardia</i> ; no inotropy	Extravasation → necrosis; wrong drug for cardiogenic shock
Norepinephrine (<i>Levophed</i>)	α_1 β_1	First-line septic shock	↑ BP via vasoconstriction + mild inotropy	"Leaves them dead" — extravasation; central line a must
Epinephrine	α_1 β_1 β_2	Anaphylaxis · cardiac arrest · severe asthma	↑ BP, ↑ HR, ↑ contractility, bronchodilation	Causes tachyarrhythmias; not the answer if HR already high
Dopamine	DA β_1 α_1 (dose- dependent)	Symptomatic bradycardia · low- CO states	Low dose → renal; mid → inotropy; high → vasoconstriction	Dose-dependent receptor switch confuses students
Vasopressin	V_1	Septic shock <i>adjunct</i> · refractory hypotension	Non-adrenergic vasoconstriction (ADH- like)	Not titratable; fixed dose; not first line alone
Dobutamine	β_1 ($\pm\beta_2$)	Cardiogenic shock · HF — <i>inotrope</i> , <i>not a</i> <i>pressor</i>	↑ contractility, may ↓ BP via β_2 vasodilation	Lowers BP — easy to mislabel as a "pressor"

— NCJMM • CLINICAL JUDGMENT MEASUREMENT MODEL

Clinical Judgment *Snapshot.*

01

WHAT IS THE #1 PRIORITY RISK?

Extravasation → tissue necrosis & limb ischemia. Phenylephrine is a potent vesicant. A peripheral IV that infiltrates can cost a patient their hand. *Central access + q15-min site assessment are non-negotiable.*

02

WHAT WILL HARM THE PATIENT FIRST?

Severe hypertension or excessive reflex bradycardia. Both can precede stroke, MI, or hemodynamic collapse. The first physiologic sign of trouble is a BP spike beyond goal MAP or HR dropping below 50 with symptoms — *before* end-organ damage is detectable on labs.

03

WHAT IS THE FIRST NURSING ACTION IN A SCENARIO?

STOP the infusion, leave the catheter in place, and notify the provider — then prepare *phentolamine* for SQ infiltration (extravasation) or titrate down (HTN). Never flush the line, never apply heat, never pull the catheter before antidote.